

9. Is Only the Present Real?

a. Presentism and the Block Universe

Have past objects, such as dinosaurs, slipped out of existence? More generally, we are asking whether the past is real. How about the future? Philosophers are divided into three camps on the question of the reality of the past, present, and future. The *presentist* viewpoint maintains that the past and the future are not real, and that only the present is real, so if a statement about the past is true, this is because some present facts make it true. Advocates of a *growing past* argue that, in addition to the present, the past is also real. Reality “grows” with the coming into being of determinate reality from an indeterminate or potential reality. “The world grows by accretion of facts,” says Richard Jeffrey. Aristotle (in *De Interpretatione*, chapter 9) and C. D. Broad advocated a growing-past theory. Parmenides, Duns Scotus and A. N. Prior are presentists.

Opposing both presentism and the growing past theory, Bertrand Russell, J.J.C. Smart, W.V.O. Quine, Adolf Grünbaum, and Paul Horwich object to assigning special ontological status to the present. They say there is no objective ontological difference among the past, the present, and the future just as there is no ontological difference between here and there. Yes, we thank goodness that the pain is there rather than here, and past rather than present, but these differences are subjective, being dependent on our point of view. This ontology of time is called the *block universe theory* because it regards reality as a single block of spacetime with its time slices ordered by the temporally-before relation. It is mental perspectives only that divide the block into a past part, a present part, and a future part. The future, by the way, is the actual future, not all possible futures. William James coined the term “block universe,” but the theory is also called “eternalism” and the “static theory of time.”

Although presentists say dinosaurs are not real, whereas eternalists say that dinosaurs are as real as anything in the present, another camp of philosophers argue that the presentist-eternalist debate is merely verbal because each side is using the word “real” in a different sense; the presentist uses it in a tensed sense, whereas the eternalist uses it in an untensed sense.

The presentist and the advocate of the growing past will usually unite in opposition to the block universe (eternalism) on the grounds that it misses the special “open” character of the future and the equally significant point that the present is so much more vivid to a conscious being than is any other time-slice of spacetime. The advocates of the block universe counter that only the block universe can make sense of relativity’s implication that, if people are in certain relative motions, an event in person A’s present can be in person B’s future. Presentism and the growing-past theories must suppose that this event is *both* real and unreal because it is real for A but not real for B. Surely that conclusion is unacceptable, they claim. Their two key assumptions here are that relativity does provide an accurate account of the spatiotemporal relations among events, and that if there is some frame of reference in which two events are simultaneous, then if one of the events is real, so is the other.

Opponents of the block universe charge that it does not provide an accurate account of the way things are because it leaves out “the now” or “the present.” This metaphysical dispute about a spatially extended present was fueled by Einstein who said:

Since there exists in the four dimensional structure no longer any slices which represent “now” *objectively*
...it appears more natural to think of physical reality as a four dimensional existence instead of, as hitherto, the evolution of a three dimensional existence.

Many philosophers, however, do not agree with Einstein.

b. Four-Dimensionalism and Perduring Objects

One implication of the block universe theory is that events are the basic objects of the universe. These are not three-dimensional but rather four-dimensional. Just as all of spacetime is a four-dimensional block, so also basic objects are four-dimensional sub-blocks. Traditionally an adult human being is a three-dimensional object existing wholly at an instant, but for the four-dimensionalist, the human being consists of its childhood and its middle age and thus exists over a time period rather than only at a time. To prolong a tennis match is to elongate its four-dimensional block along the time axis. Objects considered four-dimensionally are said to be “perduring objects” as opposed to the three-dimensional “enduring objects” of common sense.

c. Truth Values and Free Will

This philosophical dispute has taken a linguistic turn by focusing upon a question about language: “Are predictions true or false at the time they are uttered?” Those who believe in the block universe (and thus in the determinate reality of the future) will answer “Yes” while a “No” will be given by presentists and advocates of the growing past. The issue is whether contingent sentences uttered now about future events are true or false *now* rather than true or false only in the future at the time the predicted event is supposed to occur.

Suppose someone says, “Tomorrow the admiral will start a sea battle.” And suppose that tomorrow the admiral orders a sneak attack on the enemy ships. And suppose that this action starts a sea battle. Advocates of the block universe argue that, if so, then the above sentence was true *all along*. Truth is eternal or fixed, they say, and “is true” is a tenseless predicate, not one that merely says “is true now.” These philosophers point favorably to the ancient Greek philosopher Chrysippus who was convinced that a contingent sentence about the future is true or false, and it can not be any value in between such as “indeterminate.” Many others, following a suggestion from Aristotle, argue that the sentence is not true until it can be known to be true, namely at the time at which the sea battle occurs. The sentence was not true before the battle occurred. In other words, predictions have no (classical) truth values at the time they are uttered. Predictions fall into the “truth value gap.” This position that contingent sentences have no classical truth values is called the Aristotelian position because many researchers throughout history have taken Aristotle to be holding the position in chapter 9 of *On Interpretation* –although today it is not so clear that Aristotle himself held it.

The principal motive for adopting the Aristotelian position arises from the belief that if sentences about future human actions are now true, then humans are determined to perform those actions, and so humans have no free will. To defend free will, we must deny truth values to predictions.

The Aristotelian argument against predictions being true or false has been discussed as much as any in the history of philosophy [See “Logical Determinism” in the Free Will article], and it faces a series of challenges. First, if there really is no free will, or if free will is compatible with determinism, then the motivation to deny truth values to predictions is undermined.

Second, according to the compatibilist, your choices affect the world, and if it is true that you will perform an action in the future, it does not follow that now you will not perform it freely, nor that you are not free to do otherwise if your intentions are different, but only that you *will not* do otherwise. For more on this point about modal logic, see Foreknowledge and Free Will

A third challenge arises from moral discussions about the interests of people who are as yet unborn. Quine argues that if we have an obligation to conserve the environment for these people, then we are treating them as being as real as the people around us now. Only the block universe view can make sense of this treatment.

A fourth challenge, from Quine and others, claims the Aristotelian position wreaks havoc with the logical system we use to reason and argue with predictions. For example, here is a deductively valid argument:

There will be a sea battle tomorrow.

If there will be a sea battle tomorrow, then we should wake up the admiral.

So, we should wake up the admiral.

Without the premises in this argument having truth values, that is, being true or false, we cannot properly assess the argument using the usual standards of deductive validity because this standard is about the relationships among truth values of the component sentences—that a valid argument is one in which it is impossible for the premises to be true and the conclusion to be false. Unfortunately, the Aristotelian position says that some of these component sentences are neither true nor false, so Aristotle's position is implausible.

In reaction to this fourth challenge, proponents of the Aristotelian argument claim that if Quine would embrace tensed propositions and expand his classical logic to a tense logic, he could avoid those difficulties in assessing the validity of arguments that involve sentences having

future tense.

Quine has claimed that the analysts of our talk involving time should in principle be able to eliminate the temporal indexical words because their removal is needed for fixed truth and falsity of our sentences [fixed in the sense of being eternal sentences whose truth values are not relative because the indicator words have been replaced by times, places and names, and whose verbs are treated as tenseless], and having fixed truth values is crucial for the logical system used to clarify science. "To formulate logical laws in such a way as not to depend thus upon the assumption of fixed truth and falsity would be decidedly awkward and complicated, and wholly unrewarding," says Quine.

Philosophers are still very divided on the issues of whether only the present is real, what sort of deductive logic to use, and whether future contingent sentences have truth values.

10. Are There Essentially-Tensed Facts?

All the world's cultures have a conception of time, but in only half the world's languages is the ordering of events expressed in the form of tense (Pinker, p. 189). The English language, for example, expresses conceptions of time with tenses but also in other ways, such as with adverbial time phrases such as "now," "tomorrow" and "twenty-three days ago." Philosophers have asked what we are basically committed to when we locate an event in the past, in the present, or in the future. For example, how should we understand the past tense verb in, "Mohammed's birth occurred centuries ago"? There are two major answers. One answer is that tense distinctions represent objective features of reality that are not captured by the popular block universe

approach. This answer takes tenses very seriously and is called the *tensed theory of time*,

or
the A-theory
in McTaggart's sense of A vs. B. A second answer to the question of the significance of tenses is that they are subjective features of the perspective from which the subject views the universe. Actually this disagreement isn't really about tenses in the grammatical sense, but about the significance of the distinctions of past, present, and future which those tenses are used to mark.

On the *tenseless theory of time*, or the *B-theory*, whether the birth of Mohammed occurred *there*

depends on the speaker's perspective; similarly, whether the birth occurs *then*

is equally subjective. The proponent of the tenseless view does not deny the importance or coherence of talk about the past, but will say it really is (or should be analyzed as being) talk about our own relation to events. My assertion that Mohammed's birth has occurred might be analyzed as asserting that the birth event

happens before

the event of my writing this sentence.

This controversy is often presented as a dispute about whether tensed facts exist, with advocates of the tenseless theory objecting to tensed facts such as the fact of Mohammed's *having been*

born. The primary function of tensed facts is to make tensed sentences true. For the purposes of explaining that point, let us uncritically accept the

Correspondence Theory of Truth

and apply it to the following past tense sentence:

Custer died in Montana.

If we apply the Correspondence Theory *directly* to this sentence, then the tensed theory would imply

The sentence "Custer died in Montana" is true because it *corresponds to the tensed fact* that Custer

died

in Montana.

Opponents of tensed facts argue that the Correspondence Theory should be applied only indirectly. One approach, the classical tenseless approach, argues that the Correspondence Theory should be applied only to the result of analyzing away tensed sentences into equivalent sentences that do not use tenses. They might say that the sentence "Custer died in Montana" has this equivalent "eternal" sentence:

There is a time *t* such that Custer *dies* in Montana at time *t*, and time *t* is before the time of the

writing of the sentence “Custer died in Montana” by Dowden in the article “Time” in *The Internet Encyclopedia of Philosophy*

In this analysis, the verb *dies* is logically tenseless (although grammatically it is present tensed). Applying the Correspondence Theory to this new sentence yields:

The sentence “Custer died in Montana” is true because it *corresponds to the tenseless fact* that there is a time *t* such that Custer *dies* in Montana at time *t*, and time *t* *is* before the time of the utterance (or writing) of the sentence “Custer died in Montana” by Dowden in the article “Time” in *The Internet Encyclopedia of Philosophy*

This analysis does not require tensed facts. The analysis is challenged on the grounds that it can succeed only for utterances or inscriptions, but a sentence can be true even if never uttered or written by anyone.

There are other challenges. Roderick Chisholm and A. N. Prior claim that the word “is” in the sentence “It *is* now midnight” is *essentially* present tensed because there is no translation using only tenseless verbs. Trying to analyze it as, say, “There is a time *t* such that *t* = midnight” is to miss the *essential* reference to the present in the original sentence because the original sentence is not always true, but the sentence “There is a time *t* such that *t* = midnight” is always true. So, the tenseless analysis fails. There is no escape by adding “and *t* is now” because this last indexical still needs analysis, and we are starting a vicious regress.

Earlier, Prior [1959] had argued that after a painful event,

one says, e.g., “Thank goodness that’s over,” and [this]...says something which it is impossible that any use of a tenseless copula with a date should convey. It certainly doesn’t mean the same as, e.g., “Thank goodness the date of the conclusion of that thing is Friday, June 15,

1954,” even if it be said then. (Nor, for that matter, does it mean “Thank goodness the conclusion of that thing is contemporaneous with this utterance.” Why should anyone thank goodness for that?).

D. H. Mellor, who advocates a newer subjective theory of tenses, says the truth conditions of any tensed sentence can be *explained* without tensed facts even if Chisholm and Prior are correct that some tensed sentences can not be *translated* into tenseless ones. If I am speaking to you and say, “It is now midnight,” then the conditions under which this is true are that my utterance of “It is now midnight” occurs at the same time as your hearing the utterance, which in turn is the same time as when our standard clock declares the time to be midnight in our reference frame. Notice that no tensed facts were appealed to in the explanation of those truth conditions. Mellor would say it is not the pastness of the painful event that explains why I say, “Thank goodness that’s over.” My gladness is explained by my *belief* that the event is past, plus its being true that the time of the occurrence of that utterance is greater than the time of the occurrence of the painful event. In addition, tenseless sentences can be used to explain the logical relations between tensed sentences: that one tensed sentence implies another, is inconsistent with yet another, and so forth. And understanding truth conditions and truth implications is the main thing you know when you understand a declarative sentence. In other words, the meaning of tensed sentences can be explained without utilizing tensed properties or tensed facts. Then Ockham’s Razor is applied. If we can do without essentially-tensed facts, then we should say essentially-tensed facts do not exist. To summarize, tensed facts were presumed to be needed to account for the truth of tensed talk; but the analysis shows that ordinary tenseless facts are adequate. So, there are no essentially-tensed facts, according to Mellor.

11. What is Temporal Logic?

Temporal logic is the representation of information about time by using the methods of symbolic logic to formalize which statements (propositions, sentences) about time imply which others. The classical approach to temporal logic is via tense logic, a formalism that adds tense operators to an existing system of symbolic deductive logic. The pioneer in the late 1950s was A. N. Prior. He created a new symbolic logic to describe our use of time words such as “now,” “happens before,” “afterwards,” “at all times,” and “sometimes”. Prior allows a proposition such as “Socrates is sitting down” to be true at one time and false at another time.

Prior was the first to appreciate that time concepts are similar in structure to modal concepts

such as “it is possible that” and “it is necessary that,” and so he adapted modal propositional logic for his tense logic. Dummett and Lemmon also made major, early contributions to tense logic.

One standard system of tense logic is a variant of the S4.3 system of modal logic. In this formal tense logic, the usual modal operator “it is possible that” is re-interpreted to mean “at some past time it was the case that.” Let the letter “P” represent this operator, and add to the axioms of classical propositional logic the modal-like axiom $P(p \vee q)$ iff $Pp \vee Pq$. The axiom says that for any two present-tensed propositions p and q , at some past time it was the case that p or q if and only if either at some past time it was the case that p or at some past time it was the case that q . The S4.3 system’s key axiom is the equivalence

$$Pp \ \& \ Pq \text{ iff } P(p \ \& \ q) \vee P(p \ \& \ Pq) \vee P(q \ \& \ Pp).$$

This axiom captures part of our ordinary conception of time as a linear succession of states of the world. Another axiom might state that if proposition q is true, then it will always be true that q has been true at some time. Prior and others have suggested a wide variety of axioms for tense logic, but logicians still disagree about what axioms are needed to make correct beliefs about time be theorems that are logical consequences of those axioms. Some extension of classical tense logic is definitely needed in order to express “ q has been true for the past three days.”

The concept of being in the past is usually treated by metaphysicians as a predicate that assigns properties to events, but, in the tense logic just presented, the concept is treated as an operator P upon propositions, and this difference in treatment is objectionable to some metaphysicians.

The other major approach to temporal logic does not use a tense logic. Instead, it formalizes temporal reasoning within a first-order logic without modal-like tense operators. This so-called method of “temporal arguments” adds an additional variable, a time argument, to any predicate involving time in order to indicate how its satisfaction depends on time. A predicate such as “is less than seven” does not involve time, but the predicate “is resting” does. If “ x is resting” is represented classically as $R(x)$, where R is a one-argument predicate, then it would be represented in temporal logic as $R(x,t)$ and would be interpreted as saying x has property R at time t . R has been changed to a two-argument predicate by adding a “temporal argument.” The time variable “ t ” is treated as a new sort of variable with its own axioms. These axioms might

allow time to be a dense linear ordering without endpoints, or to be even more like the real numbers.

Occasionally the method of temporal arguments uses a special constant symbol, say “n”, to denote now, the present time. This helps with the translation of common temporal propositions (statements, or declarative sentences). For example, let q be “Socrates is sitting down.” The proposition that q has always been true may be translated into first-order temporal logic as

$$(\forall t)[(t < n) \rightarrow q(t)].$$

Some temporal logics allow sentences to lack a classical truth-value. The first person to give a clear presentation of the implications of treating declarative sentences as being neither true nor false was the Polish logician Jan Lukasiewicz in 1920. To carry out Aristotle’s suggestion that future contingent sentences do not yet have truth values, he developed a three-valued symbolic logic, with all grammatical declarative sentences having the truth-values of True, False, or else Indeterminate [T, F, or I]. Contingent sentences about the future, such as Aristotle’s prediction that there will be a sea battle tomorrow, are assigned an I. Truth tables for the connectives of propositional logic are redefined to maintain logical consistency and to maximally preserve our intuitions about truth and falsehood. See (Haack, 1974) for more details about this application of three-valued logic.

Different temporal logics have been created depending whether one wants to model circular time, discrete time, time obeying general relativity, the time of ordinary discourse, and so forth.